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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/563,348

09/19/2007

Gerhard Schanz

3575

4387

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7590

10/05/2009

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EXAMINER

JANCA, ANDREW JOSEPH

ART UNIT

PAPER NUMBER

1797

NOTIFICATION DATE

DELIVERY MODE

10/05/2009

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

striker@strikerlaw.com

Office Action Summary	Application No. 10/563,348	Applicant(s) SCHANZ ET AL.	
	Examiner Andrew Janca	Art Unit 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 June 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Terminal Disclaimer

1. The terminal disclaimers filed on 6/24/09 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of any patent granted on Application Numbers 10/563,354 and 10/563,191 have been reviewed and is accepted. The terminal disclaimer has been recorded.

Response to Arguments

2. Applicants' arguments filed 6/24/09 have been fully considered but they are not persuasive. Although formally moot in view of the new grounds of rejection, the same prior art is referenced and so they will be addressed below.

3. Regarding the first pages of Applicants' Remarks (p 9 para 4-p 10 para 2), Applicants are directed to paragraph 6 of the prior action for reference to the microstructure units recited in the claims: although a subset of these units and a different channel are identified in the rejections below to conform to the claim amendments, the structure is similar. Regarding the last paragraph of p 12, Applicants' disclosure does not supply an explicit definition of "microstructure unit", but rather a description of desirable properties a "microstructure part" might have. Where the specification does explicitly discuss the term "microstructure unit", it is to note that "The microstructure units, however, can also be linear, unbent or have any other geometric shape" (Specification 9/19/07 p 7, lines 4-5 from the bottom). The raised structure

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separating the part channels 32 of Ehrfeld (figure 3a) is a physical structure, the outer walls of which define the inner walls of part channels 32. Since it is part of a disk taught for use in a micromixer (Ehrfeld: title, claims 1-22), it may be reasonably be called a “microstructure unit”, and so unquestionably is included in the scope of Applicants’ claims.

4. Regarding page 10 (paras 3-4) of the Remarks, channel 31 and each leg of channels 32 may reasonably be considered a channel which may be identified as different from each other, despite the absence of valves or physical dividers between them; as may the linking channel 31-32-33 and the part channels 34 referred to in the rejections below. The Bristol Channel, St George’s Channel, and the Irish Channel (Straits of Moyle) circling around the western coast of Great Britain have no barrier preventing their fluid communication: they flow one into the other sequentially, but are given separate names because they can be separately identified upon a map. The Arkansas River and White River bifurcating off the Mississippi River in the state of Arkansas were considered separate channels for the centuries after they first received those names, long before the introduction of locks and barriers which partly separated them in modern times.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

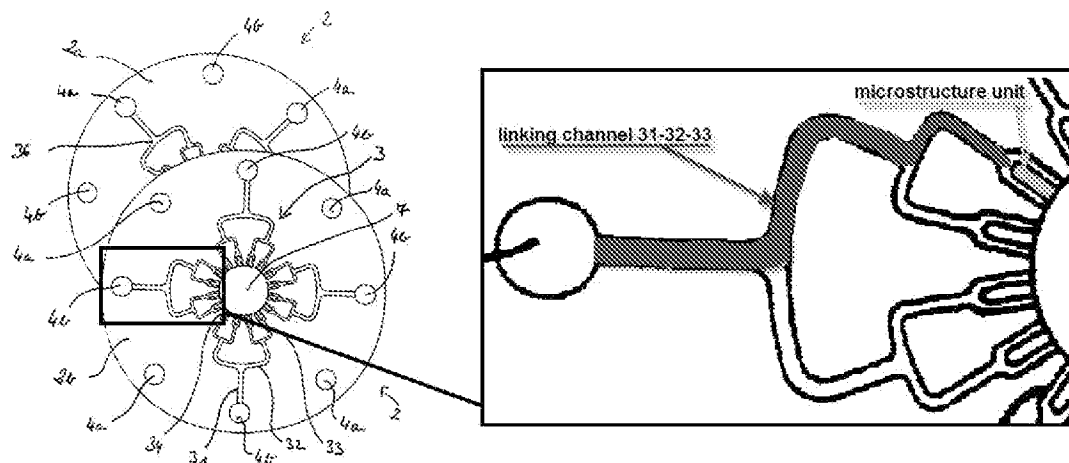
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1-15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 2003/0039169 A1 to Ehrfeld et al.



8. With regard to claim 1, Ehrfeld et al teach a component for a static micromixer (figure 3a) in the form of a disk (2a) comprising at least one inlet opening (4b) for the introduction of at least one feed stream into a linking channel (31-32-33, see attached annotated figure 3a) disposed in the plane of the disk and at least one outlet opening,

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the outlets of part channels (34), for the outflow of the feed stream into a mixing zone (7) disposed in the plane of the disk, wherein the inlet opening (4b) is connected with the outlet opening in a communicating manner through the linking channel (31-32-33) disposed in the plane of the disk, and wherein the linking channel (31-32-33) immediately before opening into the mixing zone (7) is divided by microstructure units, the unnumbered raised portions between part channels 34, into two or more part channels (34), the widths of the part channels being smaller than the width of the mixing zone (7) (figure 3a, para 51). Ehrfeld et al does not explicitly teach that the widths of the part channels be in the millimeter to submillimeter range: however, it would have been obvious to one of ordinary skill in the art to manufacture the disk of Ehrfeld et al so that all its channels be of millimeter to submillimeter range: the motivation would have been the teaching by Ehrfeld et al that they disclose a “Micromixer”, as their invention is titled. Alternatively, it has been held that where the only difference between a claimed invention and the prior art was a recitation of relative dimensions of the claimed device, and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device is not patentably distinct from the prior art device. See *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), *cert. denied*, 469 U.S. 830, 225 USPQ 232 (1984).

9. With regard to claim 2, that the widths of the part channels (34) at their opening into the mixing zone may be on the micrometer to millimeter scale and hence lie within the range 1 μm to 2 mm, is obvious over Ehrfeld et al for the reasons given with regard to claim 1 above.

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10. The additional elements of claim 3, including that the ratio of the greatest width of the linking channel (31-32-33) and/or of the width of the inlet opening (4b) to the width of the part channels (34) is greater than 2, are obvious over Ehrfeld et al (figure 3a).

11. The additional elements of claim 4, including that the ratio of the length to the width of the part channels (34) is from 1:1 to 20:1, are taught by Ehrfeld et al (figure 3a).

12. The additional elements of claim 5, including that the ratio of the width of the mixing zone (7) to the width of the part channels (34) is greater than 2, are taught by Ehrfeld et al (figure 3a).

13. The additional elements of claim 6, including that additionally the disk further comprises at least one flow-through opening, another one of (4a, 4b), are taught by Ehrfeld et al (para 51).

14. The additional elements of claim 7, including that at least one of the inlet openings (4b) or flow-through openings (4a, 4b) or the mixing zone (7) is enclosed by the plane of the disk and that the linking channel (31-32-33) is formed by an indentation, are taught by Ehrfeld et al (paras 30, 51).

15. The additional elements of claim 8, including that at least one of the inlet openings (4b) or flow-through openings (4a, 4b) is disposed at the edge of the disk or as a recess at the edge of the disk, are taught by Ehrfeld et al (figure 3a).

16. The additional elements of claim 9, including that the disk comprises at least two inlet openings (4b) for at least two different feed streams, each inlet opening (4b) being connected in a communicating manner with an outlet opening, the outlet to a communicating part channel 34, through a linking channel (31-32-33) disposed in the

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plane of the disk which may be used for at least two different feed streams, are taught by Ehrfeld et al (figure 3a).

17. The additional elements of claim 10, including that there are present two inlet openings (4b) for two different feed streams, each inlet opening (4b) being connected with the mixing zone (7) through one linking channel (31-32-33) and the outlet openings, the outlets to linking channels 34, of the two part channels (34) being disposed opposite one another, are taught by Ehrfeld et al (figure 3a).

18. The additional elements of claim 11, including that the outlet openings, the outlet openings of part channels 34, are arranged on a circular line, are taught by Ehrfeld et al (figure 3a).

19. The additional elements of claim 12, including additional through-holes, one of (4a, 4b) and additional part channels (34) the latter being integrated into the microstructure units (identified regarding claim 1 above) and being separated from the part channels (34), are taught by Ehrfeld et al: there are in all four separate sets of inlet channel (4b)-linking channel (31-32-33)-part channel (34)-outlet (outlet of 34) channel systems on the disk of Ehrfeld et al (figure 3a).

20. With regard to claim 13, Ehrfeld et al teach a static micromixer (para 1, claim 15) comprising a housing (para 26) at least two disks (2a, 2b) as defined in claim 1 (claim 15) arranged into a stack in the housing (claim 15, para 52), wherein the disks are superposed on one another so that the inlet openings (4b) form subsidiary channels for introducing a particular feed stream and the mixing zones (7) form a main channel for removing the product stream, and the main and subsidiary channels extend through the

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stack (paras 12, 32, 52). Ehrfeld does not explicitly teach that the housing should have at least 2 fluid inlets and at least one fluid outlet. However, it would have been obvious to one of ordinary skill in the art to provide two fluid inlets: the motivation would have been to supply the at least two fluids to be mixed from the at least two reservoirs taught by Ehrfeld et al (para 15); and at least one outlet: the motivation would have been because Ehrfeld et al teach their apparatus to be a micromixer (para 1), not a container for fluids.

21. The additional elements of claim 14, including that the linking channels (31-32-33) of the disks (2a, 2b) are formed by indentations (para 30) and that the linking channels (31-32-33), before opening into the mixing zone (7), are divided into part channels (34) by the microstructure units provided on the disk, are taught by Ehrfeld et al (figure 3a).

22. The additional elements of claim 15, including that the linking channels (31-32-33) of the disks (2a, 2b) are formed by recesses in the disks (para 30), the disks (2a, 2b) being arranged as intermediate disks between a cover disk and a bottom disk (para 20: there may be more than three disks, that is at least four: one on the top of the stack, one on the bottom, and two in between), and that the linking channels (31-32-33) before opening into the mixing zone (7) are divided into part channels (34) by microstructure units, the unnumbered raised portions between part channels 34, provided on the cover disks and/or bottom disks, are taught by Ehrfeld et al (figure 3a, paras 51-55, claim 15).

23. With regard to claim 17, Ehrfeld et al teach a combustion reactor having a micromixer with at least one component as defined in claim 1 (Ehrfeld et al claim 15).

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Ehrfeld et al do not explicitly teach that the reactor should have at least one connection for introducing a combustible liquid or gaseous medium, and at least one second connection for introducing a combustion reaction-promoting medium. However, it would have been obvious to one of ordinary skill in the art to provide two fluid inlets, which could be used for a combustible liquid or gaseous medium, and a combustion reaction-promoting medium: the motivation would have been to supply the at least two fluids to be blended from the at least two reservoirs taught by Ehrfeld et al (para 15). The limitations that the fluids to be blended be a combustible liquid or gaseous medium and a combustion reaction-promoting medium are statements of intended use. It has been held that “[e]xpressions relating the apparatus contents thereof during an intended use operation are of no significance in determining the patentability of the apparatus claim.” See *Ex parte Thilbault*, 164 USPQ 666, 667 (Bd. App. 1969).

24. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ehrfeld et al in view of US 5,534,328 to Ashmead. Ehrfeld et al do not explicitly teach that their micromixer further comprise an integrated heat exchanger. However, Ashmead teaches a micromixer comprised of stacked plates 200-300-400 with intercommunicating channels, integrated with stacked-plate heat exchangers 74-500-600 (figure 2; 9:4-25). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to integrate a heat exchanger into the stacked micromixer of Ehrfeld et al, as does Ashmead: the motivation would have been to achieve more precise temperature control and more uniform temperature (Ashmead 6:8-15).

Conclusion

25. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **this action is made final**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Janca whose telephone number is (571) 270-5550. The examiner can normally be reached on M-Th 8-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on (571) 272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AJJ

/DAVID L. SORKIN/
Primary Examiner, Art Unit 1797